Institutional Collaboration for Arsenic Mitigation in Affected Countries in South-East Asia

Report of an Intercountry Workshop
Kolkata, India, 11–13 September 2007

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Contents

1. Introduction

Arsenic in water has been recognized in the South-East Asia (SEA) Region as a serious threat to health since the 1997 meeting on arsenic contamination in groundwater organized by WHO's South-East Asia Region Office (SEARO). Whereas initially, West Bengal in India and Bangladesh were found to be seriously exposed due to their location in the delta of the Ganga-Brahmaputra, it gradually became apparent that Myanmar and Nepal also had several districts that had arsenic-contaminated groundwater. More recently, arsenic has been found in the Assam, Bihar and Uttar Pradesh regions of India.

WHO, United Nations International Children's Emergency Fund (UNICEF) and national partners have been supporting national authorities and academic institutes on assessment and mitigation of arsenic in drinking water. Since 2002, after a regional meeting hosted by the Government of Bangladesh, WHO has focused on the health aspects of arsenicosis. The aim of the WHO initiative was to develop harmonized norms and guidelines for use by regional countries. A first outcome was SEARO expert-agreed Arsenicosis Case Definition Algorithm. The Field Guide for Detection, Management and Surveillance of Arsenicosis Cases was subsequently published at the end of 2005.

The regional attention to water and health aspects of arsenicosis has led many government agencies, academic institutions and sector support agencies to develop capacity to address the arsenic scourge. Water quality, geohydrology, melanosis and keratosis, case definition, irrigation with arsenic contaminated water, bio-availability of arsenic and nutrition are all keys to a complex problem.

To capitalize on all these diverse regional activities, WHO held an intercountry workshop aimed at achieving prevention and mitigation of arsenicosis through strengthening institutional collaboration at the regional and national levels.

The Intercountry workshop on prevention and mitigation of arsenicosis through strengthening institutional collaboration was held in Kolkata, India from 11 to 13 September 2007. There were 28 participants representing various stakeholder segments including representatives from water supply, health, academic institutions and laboratories from Bangladesh, India, Myanmar, Nepal and Thailand. WHO provided the secretariat for the meeting. A list of participants is enclosed with this report.

2. Objectives of the workshop

The objectives were to:

- Review the effectiveness of approaches to assess and mitigate health impacts due to arsenicosis;
- identify strengths and challenges in the existing institutional setup in terms of effective collaboration;
- recommend strategic mechanisms and approaches for effective implementation of Arsenic mitigation at local level.

3. Inaugural session

The workshop started with a warm welcome extended to all the participants by Ms. Payden, Regional Advisor, WHO South-East Asia Regional Office (SEARO) on behalf of Dr. Samlee Pliangbangchang, the Regional Director of the SEARO. She gave an overview of the water quality problems and the challenges faced by the Region in overcoming these. An overview of arsenic contamination in ground water sources used for drinking and its impact on human health was presented by Mr. Han Heijnen, Environmental Health Advisor, WHO Nepal, in his keynote address. He described the path taken to tackle the arsenic threat through water testing, geo-hydrological investigations, assessment of populations exposed and the risk of exposure, development of mitigation options in water treatment, effects of arsenic in the food chain and patient identification and management. The common efforts in affected countries have yielded a lot of new knowledge relevant to the SEA Region and the affected populations. The challenge now is to make sure that everyone has access to the information and knowledge that has been generated and

validated. Institutional networking and academic and professional exchanges are critical methods for updating our tools in mitigating the arsenic problem. At the local level, effective collaboration between the local administration, health authorities and water supply professionals is key to establishing and sustaining the mitigation programmes.

Shri Goutam Deb, Hon'ble Minister-in-Charge, Department of Housing and Public Health Engineering, Government of West Bengal, India in his inaugural message stated that the Department of Public Health Engineering, Government of West Bengal, in consultation with the Arsenic Task Force of the Government of West Bengal, has developed a holistic master plan for mitigation of the arsenic problem in the state with support from the Ministry of Rural Development. He also stated that the Public Health Engineering Department (PHED) is committed to supply arsenic free safe water to the communities. He congratulated WHO for organising the intercountry workshop and welcomed the delegates.

4. Plenary session I

The session was facilitated by Prof. Arunabha Majumder, who gave a briefing on the objectives and agenda of the workshop. Four technical papers were presented by the temporary advisors from India and Bangladesh.

Prof. K.J. Nath presented on the extent and magnitude of environmental arsenic in South-East Asian countries. Today arsenic contamination in groundwater has been detected in 70 countries on 6 continents, and various others countries are suspected to have arsenic in groundwater. Although arsenic occurs in alluvial sediments, the ultimate origin of arsenic is thought to be in outcrops of hard rocks higher up the Himalayas. Arsenic does not occur at all depths in the alluvial sediments. The mechanism of dissolution of arsenic from soil sediments to the groundwater may occur due to oxidation of arseno pyrites or reduction of arsenic-rich iron oxyhydroxides. Underground microbial and chemical reaction influenced by agricultural and irrigational practices, use of phosphate fertilizers and profligate use of ground water may also be enhancing the arsenic contamination problem. However, the real mechanism of entry of arsenic contamination in groundwater still needs further study.

In both West Bengal (India) and Bangladesh, testing indicates that in 25% of the existing tube wells, arsenic contamination is beyond the national standards of 50 ppb. Information on the burden of disease due to arsenicosis is still unclear and varies with the sources consulted.

Dr. D.N. Guha Mazumder shared his experiences on the health impact due to chronic arsenic toxicity in West Bengal. The clinical manifestations of arsenicosis patients include keratosis, melanosis, chronic liver problems, hepatomegaly, portal hypertension, splenomegaly, weakness, dyspepsia, conjunctivitis, non-pitting edema, polyneuropathy, skin cancer and internal cancer. To ascertain the prevalence of keratosis and melanosis in relation to arsenic exposure, a first population-based survey was carried out on 7683 participants (4093 female and 3590 male) in West Bengal with individual arsenic exposure data (1). Calculation by dose per body weight showed that men had roughly two to three times the prevalence of both keratosis and melanosis compared to women apparently ingesting the same dose of arsenic from drinking water (1).

A retrospective study of pregnancy outcomes and infant mortality was conducted in West Bengal, among 202 married women selected from a source population of 7683 between the years 2001 and 2003. High concentrations of arsenic ($\geq$200 μg/l) during pregnancy were associated with a six-fold increase in risk for stillbirth after adjusting for potential confounders (2). Dr. Guha Mazumder stressed the need for rational arsenicosis case detection and management. Accordingly, institutional collaboration would be necessary at all levels.

Prof. Indira Chakraborty presented the results of a small-scale study on arsenic in the food chain, conducted by the All India Institute of Hygiene and Public Health (AIIHPH) during 2003 and 2005. The study indicated that arsenic is ingested through cooked food and drinking water in arsenic-affected areas of West Bengal. Vegetables grown with arsenic-contaminated water had a higher level of arsenic than those grown in unaffected areas. Food prepared by using arsenic-contaminated water retains arsenic. Especially when cooking rice with arsenic-contaminated water, most of the arsenic will remain in the cooked food. About 57% of arsenic intake can be from food cooked in arsenic-contaminated water. It was recommended to carry out more studies for obtaining conclusive results on the contribution of food to exposure to arsenic.

Mr. S.M.A. Rashid presented Bangladesh experiences of arsenic in food chain. As a part of the "green revolution" in Bangladesh, 4 million hectares are under irrigation and 2.4 million hectares are irrigated with approximately 500 000 shallow tube wells, and it is estimated that 1 million kilos of arsenic is added to the arable soil of Bangladesh since the start of the "green revolution". Research on arsenic estimation on food-stuffs in arsenic-exposed areas in Bangladesh showed that rice as well as vegetables was contaminated with high-level concentrations of arsenic. In two arsenic-affected areas of Bangladesh, the food-stuffs contribute a higher concentration of total arsenic intake than drinking water. Higher arsenic content has been found in some vegetables in arsenic-affected areas.[1]

Prof. M. Feroze Ahmed presented on the arsenic mitigation programme in Bangladesh. He stated that more than 40 million people in Bangladesh are exposed to arsenic (>10 μg/l) from drinking water. Arsenic screening testing indicated 1.44 million tube wells out of a total 5.07 million tested are contaminated with arsenic (>50 μg/l). He highlighted the arsenic mitigation policy and plan which states that "Access to safe water for drinking and cooking shall be ensured through implementation of alternative water supply options in all arsenic affected areas. All arsenicosis cases shall be diagnosed and brought under effective management system. Impact of arsenic on agricultural environment shall be assessed and addressed". He also explained the various elements of the mitigation plan such as arsenic safe water supply strategy, alternative technologies for providing arsenic free water supply and treatment technologies for arsenic contaminated water which are in progress for arsenic mitigation in Bangladesh.

5. Plenary session II

The second plenary session was held on 12 September 2007. This session consisted of presentations from various countries. A presentation on Thailand was given by Dr Somkiat Siriruttanapruk and Ms Nopakao Prohmee. Arsenic contamination in ground-water has been detected in 25

[1] Guha Mazumder, D. N., Haque, R., Ghosh, N., et al. Arsenic levels in drinking water and the prevalence of skin lesions in West Bengal, India. Ins J Epidemiol 27(1998), 871-7.

[2] von Ehrenstein, O.S., Guha Mazumder, D.N., Smith, M.H., et al. Pregnancy outcomes, infant mortality and arsenic in drinking water in West Bengal, India. Am J Epidemiol 163 (2006) 662-9.

out of 76 provinces in southern Thailand. The national survey by the Department of National Resources showed an average of 20 ppm arsenic (Max detected: 20 000 ppm, Min detected: 0.5 ppm) in ground-water as per analysis of 41 772 samples. Two phases of surveys have been carried out from 2003 to 2007. The first phase was carried out to identify high-risk population and urinary arsenic levels among that group; the second phase looked at arsenic speciation in five high-risk provinces and high-risk factors for arsenic exposure. It was concluded that the major source is from water contamination, either natural or man-made from mines and the use of pesticides. Although overall incidence of arsenicosis is still low, Thailand is working towards implementation of preventive and control measures.

Dr Khin Myat Tun and Dr Than Htut presented the arsenic situation in Myanmar. So far, drinking water of approximately 6566 villages and 56 townships have been tested for arsenic and around 8.11% samples were found to be contaminated with more than 0.05 mg/l. GIS mapping and data analysis have been taken up for the arsenic-affected areas. Contaminated tube wells have been marked red. An awareness campaign through basic health staff and local authorities has been initiated to educate people to use arsenic-safe water for drinking and cooking. Various technological options have been developed and promoted in making water arsenic-free, such as rainwater harvesting, improvement of pond and dug wells, deep tube wells as deep tube wells with >150 m depth are found to be generally safer, surface water treatment and treatment of arsenic-contaminated water. Dug wells are wells with shallow depth dug above the contaminated aquifer but it has a secondary risk of bacteriological contamination. Therefore, improvement of dug wells to prevent bacteriological contamination is one of the options to provide arsenic free water. Rooftop rainwater harvesting connected to a proper storage tank with proper collection facilities combined with treatment at the household level is another option for promoting arsenic free water. In the absence of any other water sources, technology for treating arsenic contaminated water has been developed such as pond sand filter, SONO filter in Bangladesh and Kanchan filter in Nepal.

Mr A.K. Mishra gave the country presentation for Nepal. Arsenic was first detected in Nepal in 1999. In Nepal, 11 million people live in southern flat lands (tarai) and around 90% of people in tarai are using ground water for drinking and irrigation purposes. Out of 1.1 million tube wells (government and private) 63% have been tested. Twenty districts are found

to be affected by arsenic contamination in ground-water. Around 2.35% of tube wells have been found to be contaminated with arsenic (>50 μg/l). However, arsenic concentrations between 10 and 50 μg/l have been found in 7.9% tube wells. The National Arsenic Mitigation Strategy includes ensuring arsenic-safe water supply through household filters, piped water systems, new tube wells and improved dug wells. Domestic filters have been developed at an affordable cost and promoted in the affected areas. Various governmental agencies, local NGOs, international NGOs and UN agencies have been involved in the various aspects of the mitigation programme. Using the WHO-SEARO arsenicosis patient detection and management protocols, training programmes have been organised for capacity building of health professionals. A prevalence study is being set up. A communication strategy and audio-visual materials have been developed for creating awareness among local communities. The Arsenic Information Management System (AIMS) has been initiated.

Mr Sudhir Kumar Ghosh and Dr. Faruque Hossain presented on the arsenic mitigation programme in Bangladesh. Arsenic in groundwater was detected in Bangladesh in 1993. At present prevalence of arsenic in drinking water has been identified in 61 out of 64 districts of Bangladesh. Water quality analysis indicated that 29% of tube wells are contaminated with arsenic over 50 μg/l (5.07 million tube wells analysed). Deep tube wells (>150 m) are found to be generally safe. But in Bangladesh, 30-35 million people are exposed to arsenic contamination. Arsenic mitigation activities include awareness building, testing of tube well water, marking of contaminated and uncontaminated tube wells, providing alternative water supply options and patient identification and management. Several villagers, unions, upazillas and districts have been identified as “very high risk” and “substantial risk”. The national committee for implementation of the National Arsenic Policy has been constituted in 2004. Similar arsenic committees have been formed at district, upazilla, union and village levels.

Mr P.K. Dutta presented the arsenic situation in West Bengal, India. The problem of arsenic contamination in groundwater in West Bengal was identified in the early 1980s. The presence of arsenic beyond permissible limits was detected in groundwater when some patients were diagnosed with symptoms of arsenicosis. The Public Health Engineering Department (PHED), Government of West Bengal, in association with several reputed institutions conducted rapid assessment and found arsenic contamination of groundwater in several districts of West Bengal, where considerable

populations were living at risk. It has been estimated that around 16 million people reside in arsenic-affected areas of West Bengal. In the meantime, the presence of arsenic contamination in groundwater has been detected in several other states of India, e.g. Chhattisgarh, Bihar, Jharkhand, Assam and Uttar Pradesh. The PHED constituted the Arsenic Task Force in 1993 to coordinate and monitor activities undertaken by various institutions and organizations in relation to arsenic pollution of groundwater, to draw up a master plan and to advise the state government, to suggest further research and to recommend measures for removal of arsenic from groundwater.

As per recommendation of the Arsenic Task Force district-level laboratories of PHED have been strengthened. As it was mandated to test all tubewells and borewells in arsenic-affected areas, 20 local laboratories have been set up with financial assistance of UNICEF in eight arsenic-affected districts. The testing for arsenic in all Government tubewells (approx. 120 000) have so far been completed. The laboratory infrastructure is maintained by NGOs and PHED. PHED plays a central role in coordinating with other organizations in all matters related to water supply, water quality monitoring and surveillance. The department has drawn up a detailed plan for supply of conventionally treated surface water as a long-term mitigation measure. PHED also make every effort, where feasible, to supply groundwater through deep borewells from arsenic-free aquifers and also installs arsenic removal units where necessary with deep borewell-based piped water supply systems.

Discussion

Participants in the workshop discussed the various issues brought up during the presentations and focused on the following salient points for subsequent discussion in the group work.

- Lessons learned from arsenic mitigation programmes adopted in different countries
  - Deficiencies, sustainability and strengthening of arsenic mitigation programme
- Health-care services and arsenicosis case management
- Social counselling of arsenicosis patients

- Community participation and user involvement
- Arsenic risk and exposure assessment
- Capacity building of stakeholders
- Institutional coordination

6. Field visit

On the second day of the workshop, participants visited a recently completed river-based surface water treatment plant of PHED WB, an NGO-managed rural laboratory and a programme aimed at arsenic mitigation measures at grassroots level with community involvement and participation.

Participants visited Mangal Pandey Water Treatment Plant at Palta constructed by PHED for supplying arsenic-free treated surface water in four blocks of arsenic-affected districts of North 24 Parganas. It is a conventional water treatment system with alum coagulation-flocculation-sedimentation, rapid sand filtration and chlorination. The treatment plant is operating through a computerized auto-controlling mechanism with on-line monitoring and regulatory system. The participants found it as a long-term mitigation strategy for arsenic affected areas.

The participants were apprised of the requirement of intensive water quality testing in arsenic-affected areas and visited a laboratory managed by an NGO (Paschim Banga Bignyan Mancha) at Barasat. The laboratory plays an active role in arsenic estimation and mapping in the area.

Participants then visited Deganga community to gain field-level experiences from stakeholders involved in the mitigation programme. The various stakeholders at the local level briefed the participants on crosssectoral functions that are rendered by them in arsenic mitigation in terms of health-care services for the arsenicosis patients, providing arsenic-free water and promoting household filters, which are sold at affordable prices.

7. Group work

Group A: Institutional collaboration

In order to mitigate arsenic contamination problems, mitigation programmes have been set up in several countries to provide alternative arsenic-free water supply, health-care services to diagnose and manage patients, water-quality monitoring and GIS mapping, awareness and sensitization. As evident from the presentations, there are many stakeholders involved in the arsenic mitigation programme. Therefore, there is a need for development of rational mechanisms for such institutional collaboration with the stakeholders at all levels, e.g. state, district, subdistrict (block) and grassroots. The group discussed the following issues for strengthening institutional collaboration:

(1) In many areas though individual agencies have been handling the programme on their own, institutionalization of the programme has not been achieved at the local level.

(2) Health care services for diagnosis and patient management are yet to be geared up in many arsenic-endemic areas.

(3) Many poor villagers suffer due to inadequate diagnostic capacity, medical assistance and social counselling.

(4) In many arsenic-affected areas community participation and involvement are at a low ebb. Many handpump-attached arsenic removal units could not be operated and maintained due to lack of effective community involvement and management capacity.

(5) In some arsenic affected areas people are still ignorant about the arsenic problem and its health effects.

Group B: Capacity building

In order to develop institutional mechanisms and collaboration, capacity building for various service-agencies including NGOs is necessary. A decentralized approach for planning, implementation, monitoring and evaluation of water supply schemes at local level requires a participatory approach to water supply development and human resource development support. There is a requirement of capacity development at all levels so that

the government agencies, support organizations, and service users can play their role effectively. Capacity development is more than training. The group discussed the following four critical issues:

- Attitude and motivation of stakeholders
- Knowledge, skill and experience
- Enabling environment
- Surveillance

Group C: Strengthening arsenic mitigation programmes

The mitigation programme demands strong capacity building for multidisciplinary sectors/departments. In West Bengal, several activities have already been started at the state level to meet the challenge of the arsenic threat. Similarly, Bangladesh and Nepal have fairly effective multidisciplinary arsenic mitigation programmes, overseen by a national arsenic committee which helps to coordinate, focus and sustain activities. An organized and structured approach is necessary for effective implementation of a mitigation programme. Institutional collaboration and capacity building are essential components. In this context, the arsenic mitigation programmes need to be strengthened to make them more effective and able to reach the unreached. The following issues were addressed during the group meeting:

- Assessment of the extent and magnitude of the problem
- Water quality monitoring
- Alternate safe water supply
- Strategy for ground water supply in irrigation
- Choice of appropriate technology
- Community participation and management
- Health care services
- Diagnosis and patient management
- Awareness and motivation
- Sustainability of the programme

8. Recommendations

The following recommendations were developed based on the group work discussions and agreed upon by the participants.

(1) Though arsenic mitigation programmes in affected countries exist, the collaboration between various stakeholders at different levels (national, state, district, subdistrict and grassroots) and across different ministries (water supply, health, local government, education, agriculture, etc) are very weak. In order to strengthen the arsenic mitigation programme, it was recommended to develop a national policy and guidelines that outline duties and responsibilities to achieve institutional collaborative efforts at all levels.

The following guidelines for strengthening the arsenic mitigation programme are suggested:

Water quality monitoring and surveillance

Development of a protocol for water testing and monitoring delineating roles of various stakeholders is needed. A network of laboratories including referrals is required. Good laboratory practices, standard operation procedures, quality assurance and control criteria must be part of the laboratory collaborative network. Operational monitoring by the water provider and communities is encouraged.

Malfunctioning of hand pump-attached Arsenic Removal Unit (ARU)

In many communities in West Bengal the hand pump with attached ARU is not functioning due to lack of community participation, capacity building etc. A suitable policy and institutional framework has to be developed to help the community to take up responsibility for operation and maintenance.

Filter media exchange/regeneration in domestic filters

Often villagers are faced with the problem of regeneration as well as exchange of media in domestic filters. Sanitary outlets such as rural sanitary marts in India with specialized trained personnel could be set up to provide quality services to the user groups in terms of timely replacement and proper regeneration of media, safe disposal of spent media and regeneration fluid. Protocols and guidelines for this are to be developed by the water supply sector.

Health care services at grassroots level

Health care services for diagnosis and management of arsenicosis patients need to be strengthened. A referral chain for arsenicosis cases needs to be established from local level to specialized hospitals for management and symptomatic treatment. Health-care staff would require training for proper diagnosis and management of arsenicosis cases. Mobile health-care facility infrastructure may need be developed so as to extend the services to the unreached.

Coordination of stakeholders

A national-level committee or organization should be given responsibility for coordination of activities of all involved in arsenic mitigation. At national (or state) level, as well as at district level, information centres should be established to provide information about area-wise contamination, statistics of arsenicosis cases and extent of contaminated aquifer, as well as advice on possible technological options for arsenic mitigation and other related topics.

Funding for arsenic mitigation

Funding for arsenic mitigation activities shall have to be ensured by the policy- or decision-makers on a continuous basis.

(2) An Arsenic Task Force (ATF)/Arsenic Steering Committee (ASC) comprising experts in the field of water, health, water resources, geology, irrigation, agriculture, environment at national/state level may need to be constituted to deal with the policy, planning, strategy of implementation monitoring and evaluation of arsenic mitigation. The task force/steering committee should have representatives from government ministries and departments, research and educational institutions, NGOs, other competent entities, donors and funding agencies. At district or subdistrict level, an Arsenic Coordination Committee (DLACC) should be formed to steer the institutional collaboration at block or grassroots level. The DLACC would function in a similar way as the national arsenic task force, using its general guidelines and principles.

(3) For rational institutional collaboration, mitigation and surveillance, capacity building of various institutions and agencies is essential. The institutional capacity building should

be linked with the community groups who are at risk from arsenic contamination of water. A coordinated institutional approach must be developed, and training modules could be prepared accordingly by the mandated delineated agency. Appropriate IEC-material should be developed for awareness-raising among villagers.

(4) Research and development should continue in educational and research organizations in the following fields:

   (a) Development of cost-effective arsenic mitigation technologies.

   (b) Basic research for arsenicosis diagnosis and case management.

   (c) Alternative water supply options (deep tube wells, surface water treatment, dug wells, rainwater harvesting etc) including hydrogeological study.

   (d) Stabilization and safe disposal of arsenic-rich sludge, spent filter media and liquids from regeneration facilities.

   (e) Arsenic in the food chain.

   (f) Other issues related to arsenic mitigation.

(5) The technical and financial support from United Nations Foundation, University of California at Berkeley, Columbia University, US Geological Survey, JICA, UNICEF and many others in addressing arsenic problems in several countries have been very useful. It was recommended to continue and to strengthen the institutional linkages with these international organizations.

Intercountry collaboration between affected countries in the Region and elsewhere in Asia has been initiated, but has so far not been utilized optimally. It was recommended to intensify collaboration through biannual intercountry conferences to share available evidence, technologies and good practices between affected countries. For instance, it would be good to have regular intercountry exchanges in Bangladesh, West Bengal, India and Nepal on arsenic on a rotating basis.

9. Closing session

In closing, Mr Ashoke Roy, Executive Engineer, DPHE, Government of West Bengal thanked WHO SEARO for convening this important workshop. He suggested that WHO hold such intercountry meetings in the future as well, because it brings all the key players from affected countries together to exchange valuable information and experience on mitigating arsenic from drinking water supply systems.

Ms Payden thanked the Government of India and the Government of West Bengal for hosting this workshop. She also thanked all the temporary advisors and participants from the five countries for their active participation and sharing their valuable experiences. She requested all the participants to follow up on the recommendations of the meeting.

Annex 1

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Annex 2

Agenda

11 September 2007

Inaugural session

Welcome - Ms Payden, RA, WSH

Key Note Address – Mr Han Heijen

Inaugural Speech – Mr. Gautam Deb, Honorable Minister for Housing and Public Health Engineering, Government of West Bengal

Vote of Thanks

Plenary session I

(i) Environmental Existence of Arsenic –Extent and Magnitude

(ii) Health effect of Environmental Arsenic

(iii) Arsenic Toxicity in Food Chain

(iv) Safe water supply through Arsenic removal or from alternative sources

(v) Discussions

Plenary session II

Arsenic problem mitigation strategy and institutional collaboration: Intercountry experiences

(i) Bangladesh

(ii) India

(iii) Myanmar

(iv) Nepal

(v) Thailand

Identification of key issues on obstacles to implement mitigation and approaches to address them

Group formation

Group A: Institutional collaboration at various levels (State / District / Block / Village)

Group B: Capacity building for rational institutional collaboration, monitoring and surveillance

Group C: Strengthening of Arsenic Mitigation programme

12 September 2007

Field Trip North 24 Pgs. (Tentative list includes visit to PHED laboratory, NGO laboratory, visit to community based treatment plants, discussions with local administration/ CBOs/ NGOs).

Group work and discussions on issues raised field trip

13 September 2007

Finalization group work presentation

Plenary session III

Group presentations and discussions.

Plenary session IV

Draw up strategic mechanism and approaches for effective implementation of arsenic mitigation at local level

Plenary session V

Finalization of recommendations for capacity building and institutional collaboration for arsenic mitigation.

Valedictory session

Arsenic in water has been recognized in the Region as a serious threat to health since the 1990s. Initially, West Bengal and Bangladesh were found to be seriously exposed due to their location in the delta of the Ganga-Brahmaputra; it was gradually found that Myanmar, Nepal and Thailand also had several districts that had arsenic-contaminated groundwater. More recently, arsenic has been found in Assam, Bihar and Uttar Pradesh.

The regional attention to water and health aspects of arsenicosis has led many government agencies, academic institutions and sector support agencies to develop capacity to address the arsenic scourge. To capitalize on all these diverse regional activities, WHO has held an Intercountry Workshop in Kolkata, India from 11 to 13 September 2007, which aimed at achieving prevention and mitigation of arsenicosis through strengthening institutional collaboration at the regional and national levels. Twenty-eight participants representing various stakeholder segments including representatives from water supply, health, academic institutions and laboratories from Bangladesh, India, Nepal, Myanmar and Thailand attended the workshop.

The workshop provided an opportunity for the participants to exchange experience and identify issues and possible solutions in addressing the challenges. The workshop came up with four key recommendations in terms of strengthening collaboration between various stakeholders, the need for capacity building at all levels (especially at the local level), research and development and regular interaction among the affected countries.

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